

Fish Associations with Small-Scale Topography in Unconsolidated Sediments

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Background

Almost 80% of the continental shelf habitat in central California consists of soft sand and mud. Research has shown that flatfish use large-scale topography in soft sand and muddy habitats as protection from currents and predators. However, little is known about the relationship between fish inhabiting these soft sediment environments and the small-scale topography.

Remotely operated vehicle (ROV) surveys were conducted across the seafloor along the outer continental shelf of southern Estero Bay (Central California) to collect still imagery including multiple species and size classes of flatfishes, eelpouts, and pricklebacks.

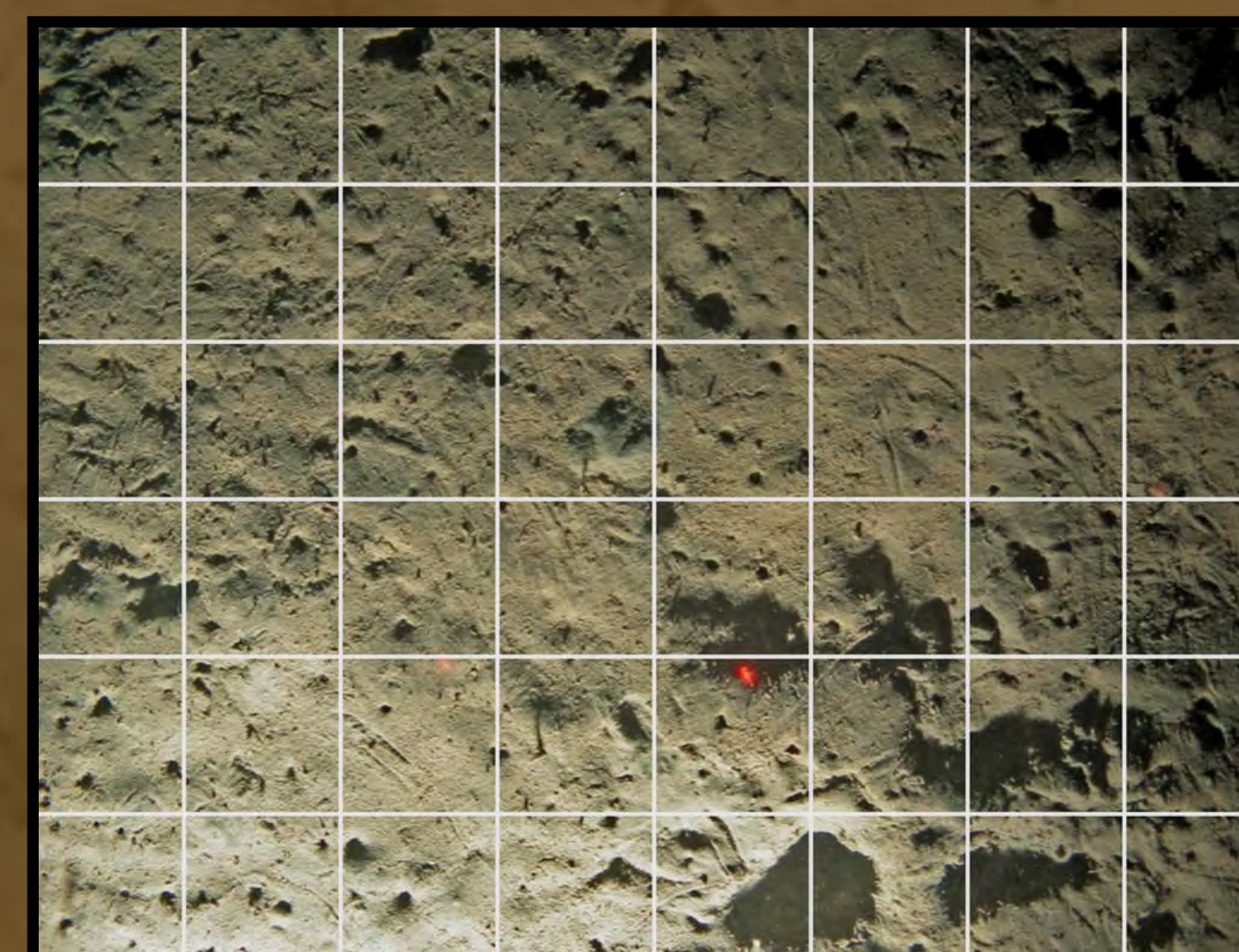


Research Question: Are these fishes utilizing the changes in topography? Do their densities correlate to the percent bioturbation?

How is Bioturbation Classified?

Bioturbation is the movement of sediment by organisms living in and on the substrate that results in topographical changes. The percent bioturbation was calculated for each photo using a grid system in which each box represents approximately 2% of the 0.4m² image.

High Bioturbation

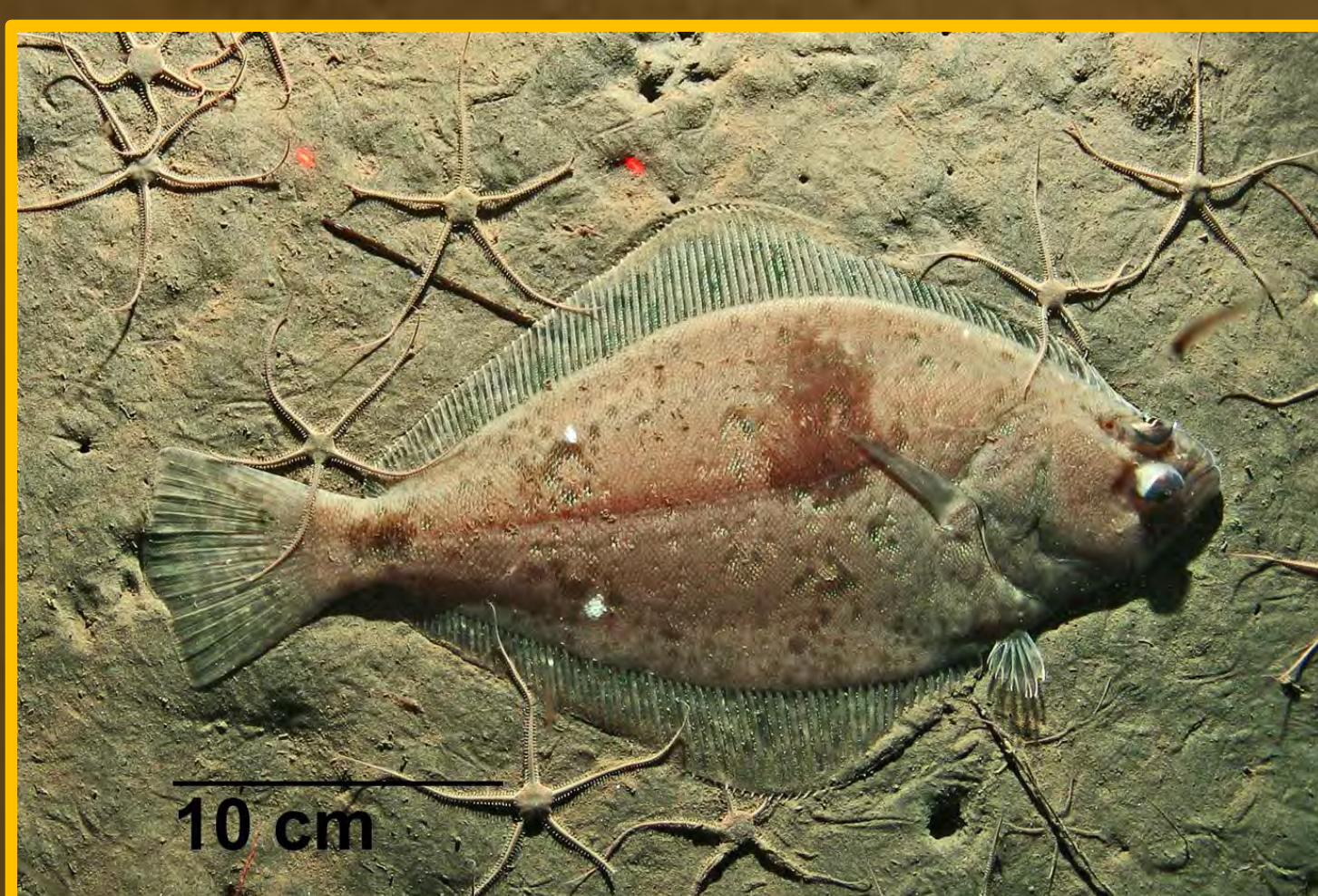


Very Low Bioturbation



Who is observed on soft bottom habitat?

Flatfishes



Flatfishes lay on the bottom, sometimes in depressions. They can often be found buried in the sediment for camouflage.

Eelpouts (Zoarcids)



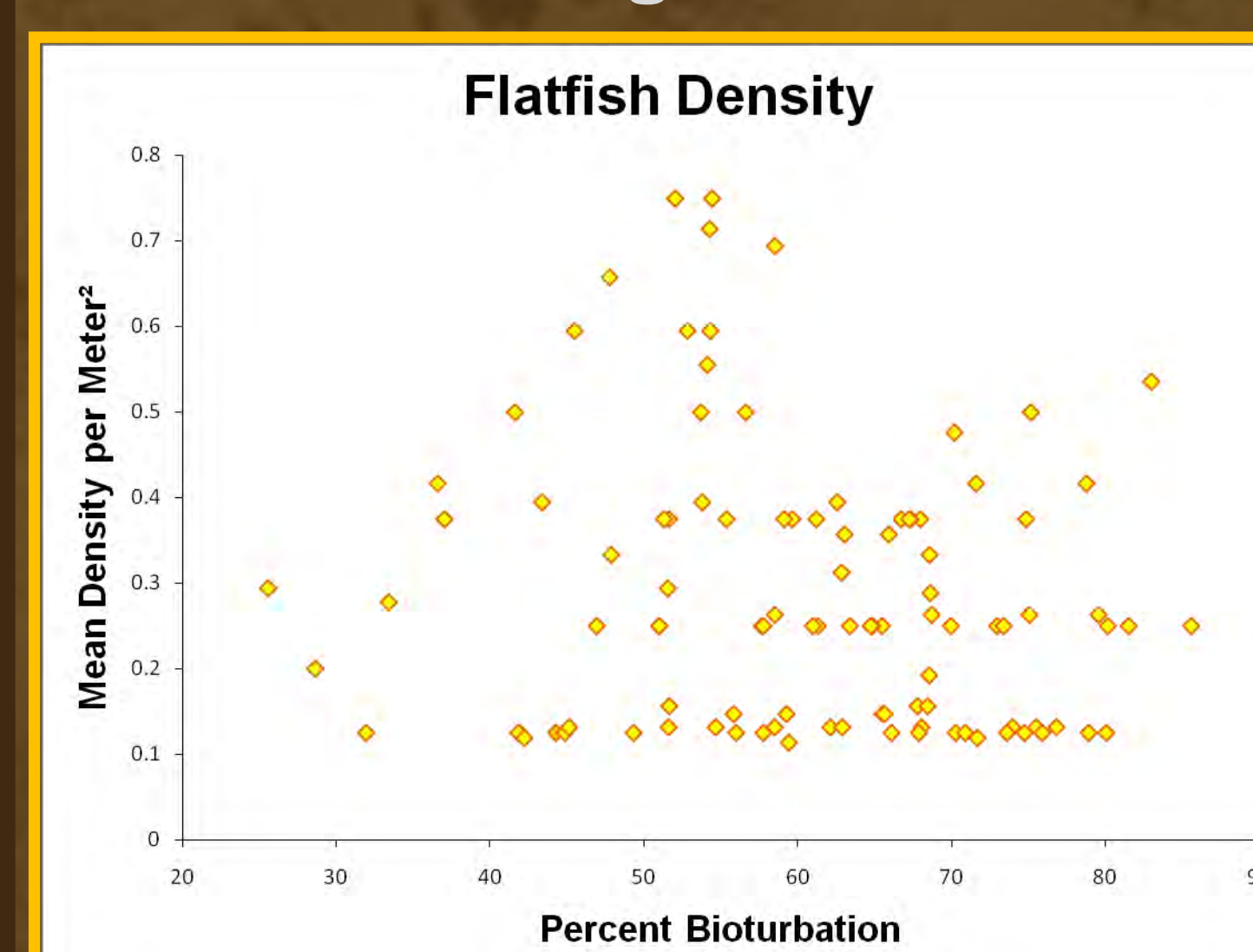
Pricklebacks (Stichaeids)



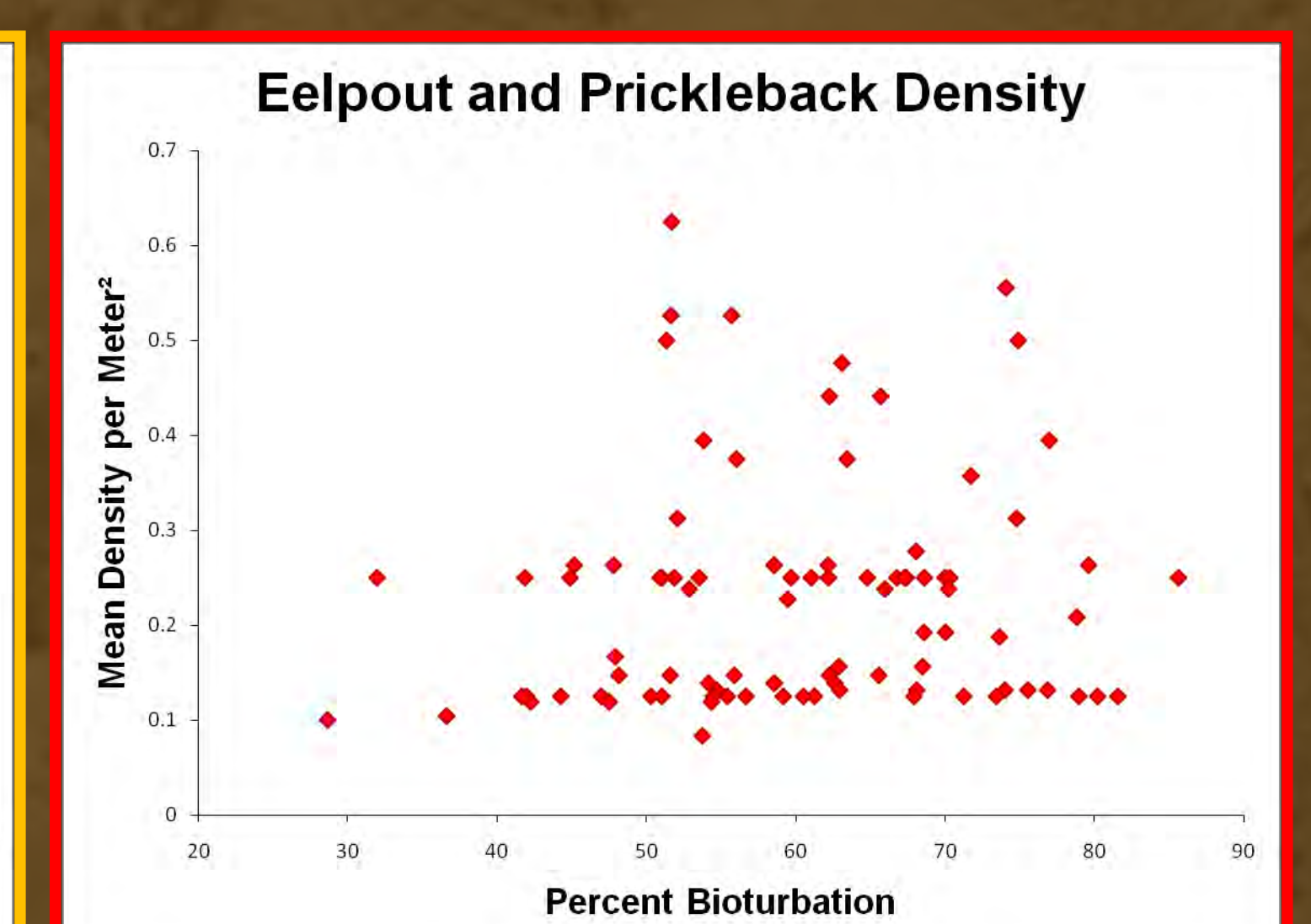
Eelpouts and pricklebacks use depressions much like flatfish. Both of these fishes burrow in soft bottomed habitats and can be found resting on the seafloor.

Results & Discussion

Flatfishes, Eelpouts, and Pricklebacks Are Not Selective in Choosing Soft Bottom Habitat Based on Bioturbation



(S=200495, $\rho = -0.13$, $p=0.18$)



(S=106105, $\rho = 0.16$, $p=0.14$)

Spearman Correlation showed there was no predictable relationship between bioturbation and fish density. It appears that flatfishes, eelpouts, and pricklebacks are not selective towards habitat based on the amount of bioturbation. **Although these fishes are observed using small topographical features, they are not seeking locations that have higher levels of bioturbation.**

Further Research

Since bioturbation is generated by organisms in the sediment which could be providing a food source, I would like to test if there is a correlation between other fish species observed in the area that are not in direct contact with the sediment. I would also like to expand the study to include anthropogenic disturbances such as trawling as a factor in fish abundance.

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